

LIST OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) A sorted tree data structure enabling rapid insertion of data segments, comprising:

a head representing functioning as a first pointer to a first leaf node of a tree structure separate from the data structure;

a tail representing functioning as a second pointer to a second leaf node of the tree structure; and

a body, physically adjacent to the head and to the tail, having a set of pointers pointing to contiguous empty nodes of the tree structure, wherein at least two contiguous empty nodes are maintained for the life of the data structure, the body including empty space distributed among non-empty leaf nodes,

wherein the sorted tree data structure is configured to transfer contents of the head to the tail when inserting a data segment such that the empty space is evenly distributed among non-empty leaf nodes.

Claims 2-3 (Cancelled)

4. (Previously presented) The apparatus of claim 1, wherein the nodes of the tree structure are indexed.

5. (Previously presented) The apparatus of claim 1, wherein each of the first and second leaf node nodes comprises a number of data segments.

6. (Currently amended) A method for rapid insertion of data segments into a data structure, comprising:

providing a sorted tree structure;

preparing a redistribution data structure separate from the sorted tree structure, said redistribution data structure having

- a head portion representing a first pointer to a first leaf node of the sorted tree structure,
- a tail portion representing a second pointer to a second leaf node of the sorted tree structure, and
- a body, logically adjacent to the head portion and to the tail portion, having a set of pointers pointing to contiguous empty nodes of the sorted tree structure;

an the preparing of the redistribution data structure including,

examining a leaf node of the tree structure associated with the head portion of the data structure;

identifying a leaf node index associated with the head portion;

copying the leaf node index to a leaf node of the tree structure associated with the tail portion of the data structure;

determining a direction in which the data structure is traversing the tree structure;

updating indices within the tree structure according to an order based upon the direction in which the data structure is traversing the tree structure; and

deleting contents of the head portion of the data structure inserting of a data segment into the sorted tree structure; and

a redistributing of the contiguous empty tree nodes by employing a the redistribution data structure, which enables to enable a more rapid insertion of the data segments,

wherein at least two contiguous empty nodes are maintained for the life of the data structure.

7. (currently amended) The method of claim 6, wherein the data segments are ~~may be~~ is inserted in any order.

8. (Previously presented) The method of claim 6, wherein the sorted tree structure comprises non-leaf and leaf nodes.

9. (currently amended) The method of claim 6, wherein the ~~tree~~ nodes of the sorted tree structure are indexed.

10. (Previously presented) The method of claim 6, wherein each of the first and second leaf nodes comprises a number of data segments.

11. (Cancelled)

12. (currently amended) The method of claim 6, wherein the step of redistributing the contiguous empty nodes redistribution process ~~comprises the data structure~~ includes traversing the sorted tree structure in one of a first direction and a second direction.

13. (currently amended) The method of claim 12, wherein the first direction ~~comprises~~ is represented by a logical one and the second direction ~~comprises~~ is represented by a logical zero.

Claims 14-45 (cancelled)

46. (Previously amended) The method of claim 6, wherein the sorted tree structure ~~may be is reverse~~ is sorted from a bottom of the sorted tree structure to a top of the sorted tree structure.

47. (Cancelled)

48. (currently amended) The method of claim 6, wherein the ~~redistribution process step~~ of redistributing the contiguous empty nodes maintains a consistent lookup operation on the sorted tree structure.

49. (New) The method of claim 6, further comprising:
moving the tail portion of the data structure according to a pre-calculated increment.

50. (New) The method of claim 6, further comprising:
re-distributing empty leaf nodes within the tree structure among non-empty leaf nodes of the data structure.

51. (New) The method of claim 6, wherein if the direction in which the data structure is traversing the tree structure is towards a beginning of the tree, then the method includes,

updating the indices between the tail portion and a nearest non-empty leaf node from a lowest tree level to a highest tree level.

52. (New) The method of claim 51, further comprising:
updating a remainder of the tree structure from the highest tree level to the lowest tree level.

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53. (New) The method of claim 6, wherein if the direction in which the data structure is traversing the tree structure is towards an end of the tree, then the method includes,

updating the indices from a lowest tree level to a highest tree level.